

EXHIBIT 2

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**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF WYOMING**

STATE OF WYOMING, et al.,

Petitioners,

v.

UNITED STATES DEPARTMENT OF THE
INTERIOR, et al.

Respondents.

)
)
) Civil Case No. 2:16-cv-00285-SWS [Lead]
)

) Consolidated with:
)

) Case No. 2:16-cv-00280-SWS
)

) Assigned: Hon. Scott W. Skavdahl
)
)
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DECLARATION OF JOHN DUNHAM

I, John Dunham, do certify under penalty of perjury as follows:

1. I am Managing Partner of Guerrilla Economics, LLC, located at 32 Court Street, Suite 207, Brooklyn, New York 11201. I can be contacted at 212.239.2105.

2. I am over the age of twenty one, and I have personal knowledge of the facts stated herein. If called upon to testify as to the matters set forth herein, I would be competent to do so.

3. I am a professional economist with an undergraduate degree from the University of Colorado, a master's degree in economics from the New School of Social Research, and a master's degree in business administration from Columbia University. I have operated an independent economic consulting firm since 2002 and have been qualified as an expert in a number of different cases in both State and Federal courts.

COSTS AND IMPACTS OF THE RULE ARE VASTLY UNDERESTIMATED

4. In its proposed rule, BLM estimated that the proposed rule would pose costs of approximately \$117 to \$174 million per year, depending on the discount rate used. In the final Rule, BLM adjusted its projections, estimating that the Rule will cost between \$110 and \$279 million per year. I performed an analysis using the range of potential costs from the proposed rule. My conclusions, however, do not change very much based on the final Rule's estimated costs as they remain within roughly the same range, albeit with a much higher potential cost.

5. My calculations suggest that the cost of implementing the proposed rule would be \$319 million per year, which is nearly double BLM's upper estimate of \$174 million per year. *See Table 1.*

Table 1
Annual Costs are Nearly Double BLM's Upper Estimate in the Proposed Rule

Impacted Component	Cost per Well	Number of Wells		Total Cost
		Impacted		
Flaring (total including limits and metering)	\$ 73,583.00	1,111	\$	81,750,713
Well Completion	\$ 7,619.00	1,575	\$	11,999,925
Pneumatic Controllers	\$ 384.00	15,600	\$	5,990,400
Pneumatic Pumps	\$ 307.69	8,775	\$	2,699,980
Liquids Unloading	\$ 3,871.00	1,550	\$	6,000,050
Storage Tanks	\$ 20,625.00	3,200	\$	66,000,000
LDAR	\$ 3,736.00	38,000	\$	141,968,000
Administrative Burden	\$ 67.34	38,000	\$	2,558,920
Total	\$ 110,193.03		\$	318,967,987.75

6. While BLM stated that it did not “anticipate a significant number of individual well shut-ins or any lease-wide shut-ins as a result of the [Leak Detection and Repair] requirements,” this is simply not the case based on BLM’s own cost projections. Oil and natural gas wells are all different, and a large proportion of them are considered low-production, or “marginally economic” (in the 13 western states covered by our model, 67.9 percent of all active wells were considered to be low production, while 80.1 percent of all wells were either dry or low production). Even a modest cost such as \$3,736 per well just for Leak Detection and Repair (LDAR) would lead to reduced production. This also does not take into account the reclamation costs that would be involved for wells that were abandoned and shut-in.

7. Based on our dynamic model of the oil and natural gas industry, which prices each component of development in each state and is based on data provided by IMPLAN, Inc., it is likely that as many as 4,700 fewer oil drilling projects would be undertaken as a result of the Rule at 2014 petroleum prices (this may be adjusted slightly under the final Rule’s cost projections). Based on 2014 models developed by John Dunham and Associates for Western Energy Alliance, this Rule could result in as many as 1,780 lost jobs directly involved with oil and natural gas development and production, and as many as 3,850 lost jobs once all supplier and induced impacts are taken into account (again, this may be adjusted slightly based on the final Rule). All told, the economy could lose as much as \$977.2 million in overall economic output annually.

8. We estimate that the annual fiscal effect of the proposed rules would be as high as \$114.1 million, of which \$65.6 million represents lost federal taxes. The remaining \$48.5 million in lost revenues would be experienced by states and local governments that depend in part on revenues from the development of oil and natural gas fields.

9. Taken together, these direct and economic costs to the economy, using BLM's cost estimates, equate to approximately \$1.26 billion in total costs once the Rule is implemented. The costs associated with lost production would continue into the future

BLM'S COST METHODOLOGIES LACK MEANING

10. BLM estimates that the Rule will cost on average between \$44,600 and \$65,800 per company per year. The BLM does not suggest how it develops per-company compliance costs. Nevertheless, dividing a cost number by a total impacted company count is not relevant. A cost to the largest operator is not the same thing as a cost to a very small operator who is likely to have between three and fifteen employees. For example, a \$65,800 cost increase would not even show up on a Fortune 500 company's balance sheet, while it might put a small firm out of business completely. Moreover, it is not plausible that a company with thousands of wells affected by the Rule would only experience an increased cost of \$65,000. Rather, larger companies are expected to each experience millions of dollars of costs associated with the Rule.

11. What is important is the additional cost to drill a well. There is a range of profitability for each oil or natural gas well drilled, which depends on numerous factors. The vast majority may not pay out at all, while a few large producers might be extremely profitable. Development firms must take this variability into account when they decide to develop any specific field or play. Increasing the overall average cost would lead companies to decide not to develop marginal opportunities, and this could have a very significant impact on specific companies or locations.

12. The fact BLM failed to estimate the cost of this Rule on a per-well basis or otherwise acknowledge the disparity in profitability on a per-well basis across different sized companies is a fundamental flaw in BLM's cost estimate. Thus, based on BLM's methodology, it is not possible to know the actual implementation costs of the Rule with any certainty or by

any meaningful metric, nor predict with any accuracy how the Rule might affect marginally economic wells or result in permanent well shut-ins.

INACCURATE AND MEANINGLESS CLAIMS ABOUT PROFIT REDUCTIONS

13. BLM claims the Rule will reduce profits by 0.15 percent per company. The claim that company profit margins would be marginally impacted by the rule is based on three key assumptions: (1) the cost per firm is equal to the total compliance cost as calculated by the agency divided by the number of firms; (2) average profit margins are representative of actual company margins; and (3) the profit margins of 26 publicly traded firms is equivalent across all 14,549 firms that BLM claims would be impacted by the rule.

14. None of BLM's assumptions are mathematically correct.

- a. First, BLM's upper estimate of the compliance costs of the proposed rule was about \$174 million per year, while a more detailed analysis (described above) suggests that the costs could be about double that estimate based on BLM's own assumptions. Since the relationship between costs and profits is not linear, any difference in actual costs would be magnified as more and more marginal companies are impacted.
- b. Second, it is incorrect to assume that an average profit margin can be applied across all 14,549 impacted firms. This might be the case if the distribution of profit margins was normal and tight—in other words BLM's analysis assumes that one company is virtually interchangeable with another and they all have very similar cost structures. This is rarely the case with oil and natural gas companies. Drilling companies will have different profit margins than oil service companies. Concluding that all companies have average profit margins is similar to saying that the

average of Warren Buffett's income and the average American worker is approximately \$1 billion per year. When data are skewed like this an average should never be used in a statistical analysis, rather a median number (a mid-point) is more appropriate.

- c. Finally, the analysis assumes that the profit margins for 26 smaller publicly traded companies is a good proxy for the industry. This is simply not true. In order for this survey of firms to be statistically significant, it would require data from about 375 small companies, not just 26. Even more importantly, BLM's analysis only examined small firms not the 318 large firms in the industry, all of which likely have a very different cost and revenue structure. In sum, the claim that profits would be reduced by just 0.15 percent is not supported by the data.

DR. HANNEMAN

15. Dr. Hanneman's opinions are not relevant to the cost of this Rule. Dr. Hanneman is correct in suggesting that Arthur Pigou defined the concept of an externality in the 1920s. However, this is irrelevant to the analysis in question. Dr. Hanneman does not produce any data or analysis as to how the Rule would either alleviate an externality, nor does he do any more than state his opinion that these particular methane emissions create a negative externality in the United States. Even if there are economic externalities associated with global climate change, international costs and benefits are not supposed to be considered as part of a regulatory impact analysis, as BLM does here. Moreover, BLM has applied no analysis to isolate climate change impacts from the Rule to the United States.

16. The use of estimates of the Social Cost of Methane (SCM), which is the only way BLM can justify this rule from a cost-benefit perspective, is highly flawed. Based on the

available literature, there is currently no understanding of exactly how reductions in methane emissions from a limited number of oil and natural gas fields in the United State might impact the general global climate (if at all). The Environmental Protection Agency (EPA) has suggested in an extremely fragile analysis that changes in methane emissions could lead to “climate change” benefits. However, EPA’s benefit values were not derived from any study, but rather from a single book published in 2000, which purports to measure the cost of climate change due to carbon dioxide (CO₂) emissions. EPA has acknowledged considerable variation among published estimates on the social cost of non-CO₂ emissions, both in terms of the models and assumptions. Furthermore, none of the other published estimates of the social cost of non-CO₂ greenhouse gases (GHGs) were consistent with the CO₂ estimates developed by an interagency working group (IWG) that included EPA and other executive branch agencies. In short, there is not adequate scientific or economic data or methodology to support the use of the SCM in this rulemaking.

17. BLM relies on EPA’s work on SCM, including EPA’s suggestion that a paper (Marten, 2014) provides the first set of published methane estimates in the peer-reviewed literature that are consistent with the modeling assumptions underlying the CO₂ estimates. What BLM fails to mention is that the authors of this paper are all EPA staff. In fact, the Marten article does not even generate its own estimates of the potential economic benefits of reduced methane emissions, but rather calculates estimates of “climate impacts” of methane relative to CO₂. CO₂ and methane are totally different gases, are produced in different places, and have different decay rates. This is why the authors come up with a sizable range of values of from \$349 to \$1,183 per ton, a 239 percent difference.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct and was executed in Brooklyn, New York on this 21st day of December, 2016.



John Dunham